3-dB Chebyshev Filter/Amplifier

046

Elsewhere in this collection of small circuits a 1-dB version of a third-order Chebyshev filter can be found. This 3-dB version is a bit steeper after the corner frequency. The inherent disadvantages are the increased ripple in the pass-band and more ringing in response to a square wave. The indicated frequency is the corner frequency at –3 dB. This time as well, two tables are printed here. **Table 1** shows an implementation with three equal resistors for the filter section and the theoretical values for the capacitors. In the case of a high-pass filter, three equal capacitors can be used. The resulting 'oddball' values can be synthesised by combining values from the E96 range.

Table 2 indicates more practical values for the filter section, by selecting E12 values for the capacitors and theoretical values for the resistors (which can be built by combining 1% components). It is best to use a very fast opamp so that the transfer function is not unduly influenced, particularly with higher gains or at higher frequencies.

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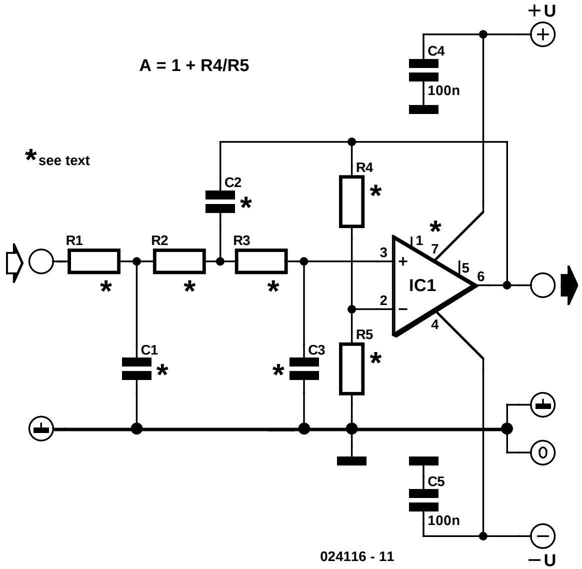

Table 1 : 3x10kΩ, 1 kHz (f_c = –3 dB)

A[dB]	C1	C2	C3
0	57.571 n	619.02 n	403.12 p
5	65.696 n	23.996 n	10.205 n
6	66.756 n	21.061 n	11.442 n
10	70.926 n	14.003 n	16.197 n
14	75.498 n	10.032 n	21.240 n
20	83.776 n	6.3885 n	30.059 n

Table 2 : 1 kHz (f_c = –3 dB), C's : E-12

A[dB]	C1	R1	C2	R2	C3	R3
0	56 n	10.299 k	560 n	10.493 k	390 p	12.171 k
5	68 n	9.3222 k	22 n	11.270 k	10 n	10.235 k
6	68 n	9.8636 k	22 n	9.6024 k	12 n	9.4615 k
10	68 n	10.665 k	15 n	9.5068 k	15 n	8.6424 k
14	82 n	8.7960 k	10 n	10.416 k	22 n	9.7338 k
20	82 n	10.508 k	6.8 n	9.4462 k	33 n	8.8083 k